

Alberta Provincial  
Achievement Testing

Subject  
Bulletin  
2011–2012

GRADE  
3

# Mathematics

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of Alberta ■

Alberta ■

Freedom To Create. Spirit To Achieve.

This document was written primarily for

Students	
Teachers	✓ Grade 3 Mathematics
Administrators	✓
Parents	
General Audience	
Others	

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You can find achievement test-related materials on the Alberta Education website at [education.alberta.ca](http://education.alberta.ca). At the home page, click on the tab [Teachers](#); then click on the link [Provincial Testing](#). Next click on the link [Achievement Tests](#), and then click on one of the specific links listed under the *Achievement Tests* heading.

Additional topics of interest are found in the [General Information Bulletin](#):

*Introduction & Revisions*

*Using Calculators & Computers*

*Administration Directives, Guidelines & Procedures*

*Accommodations*

*Contacts*



# ***Grade 3 Mathematics Assessment***

## ***General Description***

The *Grade 3 Mathematics Achievement Test* consists of one booklet which contains 40 multiple-choice questions. Each question is worth one mark. The entire test is developed to be completed in 60 minutes. Children may be given a short break during the test, at a time deemed suitable by the classroom teacher. Students may take an additional 30 minutes to complete the test.

Students record their answers to all questions directly in their test booklets.

If a word that warrants a definition is used on a test, it will be defined on the page on which it appears.

**Note:** If the student is having difficulty reading a word or phrase that is not a mathematical term, the teacher may read the word or phrase to the student and explain its meaning.

## ***Multiple-Choice Questions***

The following information briefly highlights the characteristics of the three types of multiple-choice questions that will be on the Achievement Test. A question is categorized according to its level of complexity.\*

\*Adapted from Norman L. Webb, Wisconsin Center for Educational Research, "Depth-of-Knowledge for Four Content Areas," March 28, 2002.

## ***Low Complexity***

Low Complexity questions typically require students to recall and/or recognize basic mathematical concepts and procedures. Students are not expected to come up with

original methods for finding a particular solution. A Low Complexity mathematical question may require a student to:

- Recall or recognize a fact, term, or definition
- Identify an example of a concept
- Perform a specified procedure (e.g. adding, subtracting, multiplying, or dividing)
- Determine an unknown number in an equation or number expression
- Solve a one-step or simple two-step word problem
- Draw or measure a simple 2-D shape or 3-D object
- Retrieve information from a graph, table, or figure

## ***Moderate Complexity***

Moderate Complexity questions typically involve more flexibility of thinking than those in the Low Complexity category. They require a response that goes beyond the habitual and may involve more than a single step. The student is expected to decide what to do, to use reasoning and problem-solving strategies, and to bring together their skills and knowledge to find a solution. A Moderate Complexity mathematical question may require a student to:

- Solve a word problem requiring multiple steps
- Compare patterns, data, or equations
- Provide justification for a solution process
- Interpret a concrete, pictorial, or symbolic representation
- Retrieve information from a graph and use it when solving a multi-step problem
- Formulate a generalization about one or more objects or patterns

## *High Complexity*

High Complexity questions typically require students to engage in more abstract reasoning, planning, analysis, judgment, and creative thought. A High Complexity mathematical question may require a student to:

- Perform a procedure which has multiple steps and multiple decision points
- Analyze similarities and differences between procedures and concepts
- Formulate an original problem
- Solve a problem in more than one way
- Explain and justify a solution to a problem
- Describe, compare, and contrast solution processes
- Provide a mathematical justification

The multiple-choice questions on the *Grade 3 Mathematics Achievement Test* will mainly be questions which are low and moderate in complexity. There will typically be three to five questions on the test which are high in complexity.

## *Use of Manipulatives and Calculators*

Students are encouraged to use manipulative materials when writing the *Grade 3 Mathematics Achievement Test*. In keeping with the intent and specific outcomes in the curriculum, students **shall not** use calculators at any time when writing the *Grade 3 Mathematics Achievement Test*.

## *Blueprint for the Grade 3 Mathematics Achievement Test*

<b>Description</b>	<b>Multiple Choice (MC) Questions</b>	<b>Proportion of MC Questions per Strand</b>
<p><b>Number</b> Develop and demonstrate number sense for whole numbers 0 to 1000 and understand fractions as part of a whole.</p> <p>Develop and demonstrate personal strategies when applying arithmetic operations (addition, subtraction, multiplication, or division) on whole numbers to create and solve problems.</p> <p>Justify the personal strategies used to solve problems.</p>	<b>18</b>	<b>45%</b>
<p><b>Patterns and Relations</b> Investigate, identify, and communicate rules for numerical and non-numerical patterns, in order to describe the world and to solve problems.</p> <p>Represent, solve, and communicate an addition or subtraction equation with one unknown number.</p>	<b>8</b>	<b>20%</b>
<p><b>Shape and Space</b> Estimate, measure, and compare, using personal referents and standard units of measurement to solve problems.</p> <p>Describe, classify, construct, and relate 3-D objects and 2-D shapes.</p>	<b>10</b>	<b>25%</b>
<p><b>Statistics and Probability</b> Collect, organize, and interpret data in a variety of ways to solve problems.</p> <p>Construct, label, and interpret bar graphs to solve problems.</p>	<b>4</b>	<b>10%</b>
<b>Number of Questions</b>	<b>40</b>	<b>40</b>
<b>Percent of Test</b>	<b>100%</b>	<b>100%</b>

## Description of Mathematics Assessment Standards

The following statements describe what is expected of Grade 3 students at the *acceptable standard* and the *standard of excellence*, based on outcomes in the [Grade 3 Program of Studies](#). These statements represent examples of the standards against which student achievement is measured. It is important to remember that one test cannot measure all of the outcomes in the program of studies.

<i>Acceptable Standard</i>	<i>Standard of Excellence</i>
<p>Students who meet the <i>acceptable standard</i> in Grade 3 Mathematics have a basic understanding of mathematical concepts and related processes. Students build on a foundation of previous learnings and derive meaning from problem-solving experiences in their world.</p> <p>They are able to</p> <ul style="list-style-type: none"> <li>• demonstrate their understanding in concrete, pictorial, and symbolic modes, and to translate from one mode to another. For example, students who meet the <i>acceptable standard</i> know that the solution to the number sentence <math>12 - 3 = \square</math> is 9, and they can demonstrate their understanding in concrete and pictorial ways</li> <li>• write related number sentences and verify them using manipulatives and diagrams</li> <li>• reflect upon, explain, and defend their ideas in an understandable way using objects, diagrams, everyday language, spoken and written symbols, and, when appropriate, technology</li> <li>• perform the mathematical operations and processes that are fundamental to the program, and apply what they know to solve one-step and simple two-step problems in familiar settings</li> <li>• describe, to a limited degree, the strategies they use to solve a particular problem</li> <li>• demonstrate confidence when using simple mathematical processes and when applying problem-solving strategies in familiar settings</li> </ul>	<p>Students who meet the <i>standard of excellence</i> in Grade 3 Mathematics have a superior understanding of mathematical concepts and related processes. They build on a foundation of previous learnings and derive meaning from problem-solving experiences in the world.</p> <p>They are consistently able to</p> <ul style="list-style-type: none"> <li>• demonstrate their understanding in concrete, pictorial, and symbolic modes, and easily translate from one mode to another</li> <li>• create problem situations to illustrate concepts, and to analyze and explain relationships among concepts. For example, students who meet the <i>standard of excellence</i> can write all number sentences related to <math>12 - 3 = \square</math>, can justify them using manipulatives and diagrams, and can create problem situations to exemplify the relationship. They are able to explain how <math>12 \div 3 = \square</math> is related to <math>12 - 3 = \square</math>; also, they are able to explain why these are not defined as related number sentences</li> <li>• reflect upon, assess, explain, and defend both their ideas and those of others, orally and in writing, using objects, diagrams, everyday and technical language, numbers and number sentences, and, when appropriate, technology</li> <li>• perform the mathematical operations and processes that are fundamental to the program, and apply what they know in solving novel multi-step problems</li> <li>• solve and create unique problems, justify their solution, and suggest other solutions and/or strategies</li> <li>• clearly describe the strategies that they use</li> <li>• persevere when solving complex problems</li> <li>• demonstrate initiative in trying new methods and are creative in their approach to problem solving</li> </ul>



# *Preparing Students for the Mathematics Test*

## *Suggestions for Preparing Students*

The best way to prepare students for writing the achievement test is to teach the Program of Studies well and to ensure that students know what is expected. Many of the skills and attitudes that support test writing are, in fact, good skills and strategies for approaching all kinds of learning tasks.

Teachers are encouraged to familiarize their students with the types of questions that will appear on the test by discussing questions that are available on the [education.alberta.ca](http://education.alberta.ca) website. A *Guide for Teachers* located at [Additional Resources](#) contains information and sample questions that can also be used when preparing students for the test.

Teachers are also encouraged to share the following information with their students to help them prepare for the *Grade 3 Mathematics Achievement Test*.

## *Suggestions for Answering Questions*

### *Multiple Choice*

- *Look at all information on the test and think carefully before you answer the questions.* This will guide students to obtain information from numbers, words, signs, charts, pictures, graphs, or maps.
- *Underline key words that help you to focus on what is expected.* This will help students to focus on what they are expected to do.
- *Remember the question that you need to answer as you look at all the information.* This will help students to focus on what is being asked of them.
- *Go back and carefully read all the information given.* This will help students to keep on track when two or three questions pertain to the same diagram. (These situations are always identified; for example, with a heading such as “Use this information to answer questions ☐ and ☐.”)
- *Check your calculations, even when your answer is one of the choices.* This will help students to choose the correct answer rather than an answer that is a commonly made mistake.
- *Choose the CORRECT or BEST answer.* This will help students to make a choice when two answers appear to be close and students cannot immediately identify the correct answer.

# *Opportunities to Participate in Test Development Activities*

## *Field Testing*

All Achievement Testing Program test questions are field tested before use. By *testing* the test questions, students who write field tests have an opportunity for a practice run at writing portions of an achievement test. As well, the teachers have an opportunity to comment on the appropriateness and quality of the test questions.

Request forms for Grade 3 Mathematics and Mathématiques 3e année field tests that will be administered in April, May, and June 2012 will be sent out to schools in August 2011. Principals and teachers who wish to participate in the field-testing program must complete and return the request forms to the Field-Test Coordinator at [field.test@gov.ab.ca](mailto:field.test@gov.ab.ca).

Once the completed request forms are received by the Assessment Sector, classes will be selected to ensure a representative and sufficiently large sample of students from across the province takes part in the field test. Every effort will be made to place field tests as requested; however, because field tests are administered to a prescribed number of students, it may not be possible to fill all requests. Once the field tests are placed, a confirmation letter of test placements will be sent to each principal in early April, with memos to the teachers who will be participating in the field testing.

For further information about achievement field testing, see the [Field Testing](#) and [Samples & Forms](#) sections of the *General Information Bulletin*.

## *Working Groups*

Teacher involvement in the development of provincial achievement tests is important because it helps to ensure the validity and appropriateness of the assessments.

To be selected to participate in a working group, a teacher must be nominated by a school administrator or superintendent, and that nomination must be approved by the superintendent. To ensure that selected working-group members have appropriate subject matter training and teaching experience, nominees are asked to provide their information to their school administrator so that it can be forwarded to the Assessment Sector at Alberta Education through the superintendent.

## ***Test Development***

Teacher working groups are used throughout the test development process to create raw forms of test questions, and to review and revise draft forms of provincial achievement tests. These working groups usually meet for one or two days, two or three times per year. Occasionally, these meetings are held on weekends.

To be eligible to serve on a test development working group, a teacher must currently be teaching Grade 3 Mathematics and must have a minimum of two years' experience teaching the course.

Teachers participating in test development and/or test review working groups are selected from the working-group nominees provided by superintendents of school jurisdictions.

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